

Applicant: HEERENS
Serial No: 10/658,800
Filing Date: September 10, 2003
Page: 2 of 10

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

1. (Currently Amended) A method of cleaning a surface of an object by removing contaminant particles from the surface of the object, the method comprising:
placing the object in the chamber with the surface to be cleaned exposed;
sealing the chamber; and
reducing a gas pressure in the chamber, wherein the gas pressure is reduced from a first pressure to a second pressure, wherein the second pressure is about 10^{-2} mbar, in less than 5 seconds.
2. (Original) A method according to claim 1, wherein the object is a lithographic mask.
3. (Canceled)
4. (Canceled)
5. (Withdrawn) A method according to claim 1, further comprising cycling the gas pressure between a low pressure and a higher pressure.
6. (Original) A method according to claim 1, further comprising increasing the gas pressure prior to reducing the gas pressure.
7. (Withdrawn) A method according to claim 1, further comprising providing an electric field to attract and remove the contaminant particles from the surface.
8. (Withdrawn) A method according to claim 7, further comprising charging the surface of the object.

Applicant: HEERENS
Serial No: 10/658,800
Filing Date: September 10, 2003
Page: 3 of 10

9. (Withdrawn) A method according to claim 1, further comprising vibrating the object.

10. (Withdrawn) A method according to claim 1, further comprising changing the temperature of the object.

11. (Canceled)

12. (Currently Amended) A method according to claim ~~11~~ 24, wherein the inert particles are condensed CO₂.

13. (Withdrawn) A method according to claim 1, further comprising applying a layer of liquid to the surface of the object.

14. (Withdrawn) A method according to claim 13, wherein the layer is uniform across an entire surface of the object.

15.-18. (Canceled)

19. (Withdrawn) A lithographic projection apparatus, comprising:
~~a radiation system configured to provide a projection beam of radiation;~~
a support configured to support a patterning device, the patterning device configured to pattern ~~a the projection beam of radiation~~ according to a desired pattern;
a substrate table configured to hold a substrate;
a projection system configured to project the patterned beam onto a target portion of the substrate; and
a device configured to remove contaminant particles from surfaces of objects comprising:
a chamber capable of being sealed; and

Applicant: HEERENS
Serial No: 10/658,800
Filing Date: September 10, 2003
Page: 4 of 10

a pump configured to reduce a gas pressure of the sealed chamber from a first pressure to a second pressure, wherein the second pressure is about to 10^{-2} mbar in less than 5 seconds.

20. (Withdrawn) A lithographic apparatus according to claim 18, wherein the device configured to remove contaminant particles comprises at least one of the following: a voltage source configured to provide an electric field to attract and remove the contaminant particles from the surface; an actuator configured to vibrate the object; an inert particle supply configured to bombard the surface of the object with inert particles; ~~or~~ and a liquid supply configured to apply a layer of liquid to the surface of the object.

21. (New) A method according to claim 1, wherein the first pressure is atmospheric pressure.

22. (New) A method according to claim 1, further comprising increasing the gas pressure to at or above about 10 atmospheres of pressure prior to reducing the gas pressure.

23. (New) A method of cleaning a surface of an object by removing contaminant particles from the surface of the object, the method comprising:

placing the object in the chamber with the surface to be cleaned exposed;

sealing the chamber;

reducing a gas pressure in the chamber from a first pressure of at or above about atmospheric pressure to a second pressure of about 10^{-2} mbar in less than 5 seconds; and

increasing the gas pressure subsequent to decreasing the pressure in the chamber, wherein the gas pressure is increased to about the first pressure in less than 5 seconds.

24. (New) A method according to claim 23, further comprising increasing the first gas pressure to at or above about 10 atmospheres of pressure prior to reducing the gas pressure from the first pressure to the second pressure.

Applicant: HEERENS
Serial No: 10/658,800
Filing Date: September 10, 2003
Page: 5 of 10

25. (New) A method according to claim 23, further comprising increasing the gas pressure to at or above about 100 atmospheres of pressure prior to reducing the gas pressure from the first pressure to the second pressure.

26. (New-Withdrawn) A method according to claim 23, further comprising at least one of the following: providing an electric field to attract and remove the contaminant particles from the surface; vibrating the object; bombarding the surface of the object with inert particles; or applying a layer of liquid to the surface of the object.

27. (New) A method of cleaning a surface of an object by removing contaminant particles from the surface of the object, the method comprising:

- placing the object in the chamber with the surface to be cleaned exposed;
- sealing the chamber;
- reducing a gas pressure in the chamber from a first pressure to a second pressure of about 10^{-2} mbar in less than 5 seconds; and
- bombarding the surface of the object with inert particles.